

Notice of Allowability

Application No.

10/618,111

Examiner

Michael J. Feely

Applicant(s)

SMITH, JAMES D.B.

Art Unit

1712

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 3/20/07.
2. ☒ The allowed claim(s) is/are 20-22.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying Indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 20070331.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with David G. Maire (Reg. No. 34,865) on March 31, 2007.

The application has been amended as follows:

In the Claims:

20. (Currently Amended) A method of increasing the thermal conductivity of an electrically insulating epoxy material without compromising the electrical insulating properties of the material, the method comprising:

stirring an LCT-epoxy resin comprising a crystalline microstructure having a layered nature with an anhydriding agent at approximately 60°C until a clear LCT-epoxy anhydride solution is formed;

after the solution is clear, adding a boehmite material into the clear solution and stirring at approximately 60°C, until the solution is again clear to form a uniform dissolution of the boehmite material substantially free of particle wetting and with essentially complete co-reactivity of the boehmite material with the LCT-epoxy anhydride; and

adding an accelerator and curing the solution;

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the method effective to produce homogeneous alumoxane-LCT-epoxy-anhydride polymers that retain the layered nature of the LCT-epoxy resin and are substantially free of micro-void formation and that exhibit a dielectric strength of at least 1.2 kV/mil while at the same time exhibiting thermal conductivity of at least 0.50 W/mK in a transverse direction and at least 0.99 W/mK in a thickness direction in an environment of 25°C.

22. (Currently Amended) The method of claim 20, further comprising dissolving zinc naphthenate into the solution as the accelerator.

* * * * *

Response to Amendment

2. The rejection of claims 20 and 21 under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Smith et al. (US Pat. No. 5,904,984) and Cook et al. (US Pat. No. 6,369,183) in view of Mertens et al. (US Pat. No. 3,369,947) *has been overcome by amendment.*

Response to Arguments

3. Applicant's arguments, see pages 4-6 of the response, filed March 20, 2007, with respect to previous prior art rejection, have been fully considered and are persuasive (*in light of the current amendment*). The rejection of claim 20-21 has been withdrawn/overcome by amendment.

Allowable Subject Matter

4. Claims 20-22 are allowed.

5. The following is an examiner's statement of reasons for allowance:

Although the combined teachings of Smith et al. and Cook et al. teach the general concept behind the instant invention, they fail to teach or suggest the sequence of solution polymerization steps set forth in the instant claims. The combined teachings contemplate the use of an anhydride as a curing agent (*see Smith et al.*); however, there is no teaching or suggestion of a co-reaction between a boehmite material in a solution of LCT-epoxy resin and an anhydriding agent (LCT-epoxy anhydride solution).

Furthermore, even if an anhydride was added as a curing agent to the hybrid epoxy resins of Cook et al., it does not appear that the final product would have been the same as or an obvious variation of the instantly claimed product. As discussed in Applicant's arguments, the instantly claimed process step sequence allows the crystalline domains of the LCT epoxy resin to

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stabilize and interlock with the anhydride *before* the addition of the boehmite material (*and prior to curing*). This allows for a *uniform dissolution of the boehmite material, substantially free of particle wetting with essentially complete co-reactivity of the boehmite material with the LCT-epoxy anhydride*. Adding the curing accelerator after the boehmite material, in turn initiates the crosslinking of an already stabilized pre-matrix. This stabilized pre-matrix is vital to the retention of the crystalline/layered nature of the cured resin and the prevention of micro-void formation. This layered nature is responsible for the unique combination of dielectric and thermal properties of the cured resin. Adding an anhydride curing agent to the hybrid epoxy of Cook et al. would have initiated crosslinking of a less stable and less ordered pre-matrix. In turn, the cured material would have been less stable and less ordered. As a result, the crystalline/layered nature of the cured product would have been different from that of the instant invention, yielding different dielectric and thermal properties.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

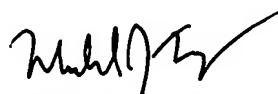
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Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is 571-272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Michael J. Feely
Primary Examiner
Art Unit 1712

March 31, 2007

**MICHAEL FEELY
PRIMARY EXAMINER**